ST. BARTHOLOMEW'S HOSPITAL JOURNAL

VOL. LIX JANUARY 1955 No. 1

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ST. BARTHOLOMEW'S HOSPITAL JOURNAL

Editor: A. J. [illegible] *Manager:* DOUGLAS CHAMBERLAIN

January, 1955

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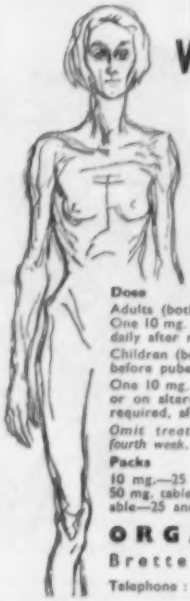

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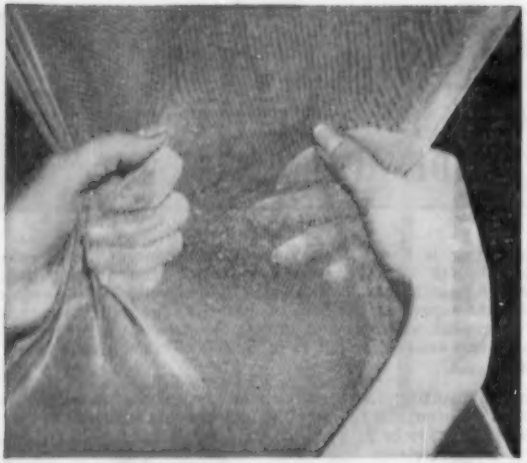

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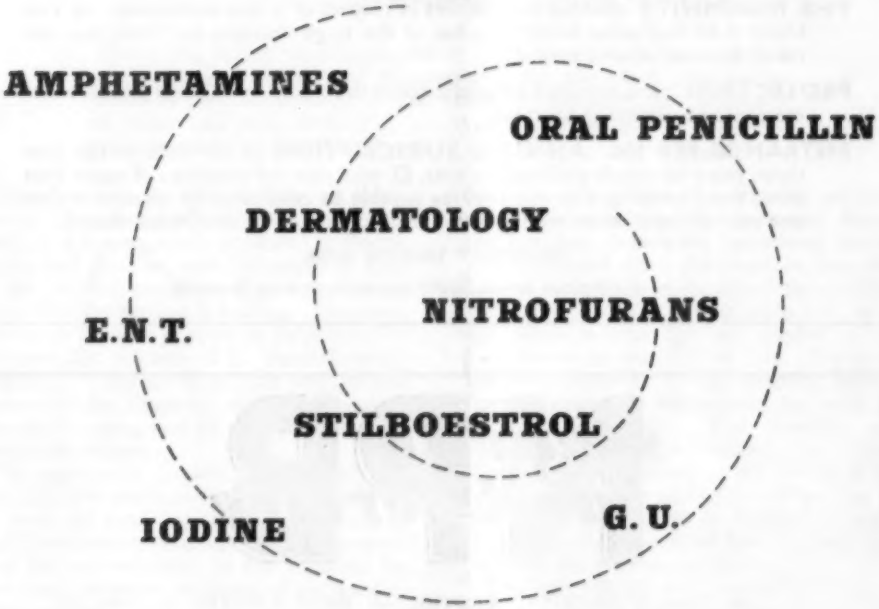

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GOLDFISH

"These (the fishes) were made out of the most entirely ignorant and senseless beings, whom the transformers did not think any longer worthy of pure respiration . . . and instead of allowing them to respire the subtle and pure element of air, they . . . gave them a deep and muddy medium of breathing."

PLATO.

The fountain in the Square is justly famous. Numerous verses have been written about it, it has regularly appeared in photographs and sketches, and frequently is used as the central motif in Christmas cards, when other inspiration is lacking. However, how much thought is given to its patient inhabitants, the goldfish of St. Bartholomew's Hospital? They serve, in their way, to add as much to the character of the Hospital as does the fountain, and they have a long and honourable history.

The colony at present consists of one large and five medium-sized goldfish. They are lively, of good appearance, and seem to be of the common variety, *Carassius auratus*. They are accompanied in the fountain by some smaller water creatures of an indeterminate nature.

Little need be said about the five smaller goldfish—they were introduced about three years ago to restock the dwindling population of the fountain, and have flourished ever since. However, some tribute must be paid to the large goldfish, who epitomises the venerable Hospital in which he dwells. He was originally purchased, along with several others, from Selfridges some 26 years ago by a doctor in the Speech Therapy Department. These appear to be the first goldfish to have been placed in the fountain. Although the others have since fallen by the wayside, the veteran remains in the best of health. Within his lifetime he has survived many trials which might well kill a lesser animal.

Several times the fountain has been frozen solid, but it must be appreciated that goldfish "thrive equally well in tropical and temperate climates." After an air-raid during the last war, numerous incendiary bombs were recovered from the fountain, but they did not seem to have disturbed the goldfish. A more severe test was to come two years ago, when a blue dye was placed in the fountain on the eve of View Day. The goldfish were removed in the morning with a startling cyanosed appearance, but with no signs of discomfort. The fountain was cleaned and the fish returned, but unfortunately one succumbed to the effects of the detergent. The introduction of hordes of tadpoles in an attempt to disturb the peace of the rightful tenants of the fountain was probably the supreme indignity.

The only official duty which the Hospital performs for the goldfish is the cleaning out of the fountain. This is regularly effected by the porters. Feeding is left to the generosity of teaching staff and students. It does not appear that any keen physiologist has yet trained the fish in Pavlovian fashion to appear for food on the ringing of a bell. A member of the teaching staff regularly inspects the goldfish for fungus, and, if this appears, the fish are removed by the porters and thoroughly scrubbed. One must praise the sensible and unassuming way in which these animals are tended.

It is often said that it is the "little things" which matter, and which are most readily noticed; and one cannot help thinking that these goldfish have their own small part in the widely heterogeneous nature of St. Bartholomew's Hospital.

Rugger Dance

Saturday evening, December 4th, was marked by the third of the season's Rugger Dances. These dances, or "hops" as they are more familiarly known, have proved more popular than the organisers at first dared to hope. At each of the three occasions this term the hostel has been swarming with merrymakers taking advantage of all that a dance for half-a-crown offers. The spot prizes have afforded yet another attraction, and the excellence of Michael Hackett as M.C. is surely appreciated by everyone. It is also gratifying to note that many of the members of the week's visiting team manage to attend, and enjoy, the dances. If only some of the lower hospital rugger sides could emulate the success of the hops the club could be said from all points of view to have taken a new lease of life.

The Boiler House

One of the smaller Cambridge colleges, well known for its table and its cellars, is said, like an iceberg, to be vaster and more spacious below the surface than above it. This Hospital is another of these. I cannot definitely say that there are underground routes between Cardiology and St. Bart's the Less or from the Central Registry to the Nurses' Home, but if there are I would no longer be surprised.

I missed my way when looking for the R.S.Q. Billiard Room. In a maze of passages with strangely marked doors at frequent intervals I met a man—shaving, and apparently an engineer—who very agreeably showed me round.

Mere doctors have little idea of what a mechanical age we live in. The Dunn Laboratory has nothing on this. Strange and powerful engines stood about in a maze of piping among pumps and dynamos of every size, some angrily in motion, others in sinister silence. In one room great vanes blew hot air down tunnels and in another gauges indicated the levels of CO_2 in hot water, which even my guide couldn't explain. Successive rooms opened out and we were among the boilers and furnaces. There was nothing diminutive about these, only they seemed very deep down. The glare from the fires and a pale electric light bulb lit the gloom. "Hades," the engineer remarked knowingly.

I have sometimes wondered at the oppressive heat and moving fans in the S.T.C. Now I understand. Deep below, the ingenious architects of more spacious days provided us with an almost model heating system and spared us that bane of hospitals, the all-dominating boiler house and chimney.

The Fountain Club

R.B.P. writes:

In this number of the *Journal* appears an outrageously long autobiography in eleven stanzas of a member of the Fountain Club, stimulated to this lyrical paean of triumph by his promotion to its chairmanship after thirty years' membership.

The Fountain Club was founded in 1919 by a group of old Bart.'s men, whose appetite for conviviality could not be appeased by the too infrequent, and too little selective opportunities of meeting their friends and contemporaries at Decennial Club dinners. The members meet for dinner in London once a month from October to June. Their numbers are limited to thirty-four town, and twenty country, members, with a rather smaller number from the Armed Services. The numbers have been maintained by constant recruitment: some of the founders are still with us, while new members continue to join up to the present year. At one of our recent dinners we were somewhat taken aback when a member claimed to have joined the Hospital in 1884. He was, however, found to be the son of a famous member of the Staff and historian of the Hospital, and was born in the Dean's quarters in the year claimed.

The Club has had many meeting places, but has been comfortably settled for many years now at Kettners Restaurant in Soho, that scene of nineteenth century Edwardian revelry. During its thirty-odd years' existence the Club has accumulated a respectable display of "plate" and furniture, mostly the gifts of retiring Masters. The "lordly chair," which enthrones the Master, is perhaps the most munificent of these: confronting it is a bronze replica of the Bart.'s Fountain by the sister of the Founder (of the Club, not of the Hospital), and facing the Clerk is a graceful statuette by the sculptor of that other well-known fountain in Piccadilly Circus. The Master's Mace, well adapted for maintaining order, is a formidable object of the type so often described at "crowners' quests" as a "round blunt instrument," and is suitably surrounded by an assortment of old pewter bleeding bowls. But never at our most hotly debated discussions, such as a

recent one on a proposal to admit ladies to an annual cocktail party, have members' blood pressures reached a point at which recourse was necessary to these purely ornamental safety valves.

Once a year we invite a guest of honour, and the list of these comprises a galaxy of distinguished stars, writers and scholars, ambassadors and Lord Mayors, soldiers and sailors, architests, scientists and Emeritus members of the Hospital Staff. Such names, taken at random, as Rudyard Kipling, A. P. Herbert, Sir Roger Keyes, Sir Henry Dale, Sir Anthony Boulby and Lord Horder give an indication of the quality of the men who have been kind enough to sit around The Fountain with us.

Our ordinary dinners are quite informal; the minutes are flippantly recorded by the Clerk, and the years have accumulated many albums of somewhat faded post-prandial wit, some (perhaps mercifully) lost in the London Blitz.

The object of the Club is good fellowship, and all that is demanded of a member is that he should be what Dr. Johnson described as "a clubbable man," with an affection for and loyalty to the traditions that centre round The Fountain of our ancient Hospital.

This is not, Mr. Editor, a prospectus touting for new members. Our condition is flourishing, and our prescribed number of members is at present complete. It is merely explanatory of the allusions to The Fountain Club, which from time to time do creep into your respected columns.

Candid Camera.

The Three Musketeers

A. C. ROXBURGH, 1886 - 1954

by DR. R. M. B. MACKENNA

To anyone who has worked in Bart.'s and who has any imagination, the Square is a very special place. It is remembered with affection in the far places of the world and wherever the men or women of Bart.'s congregate. It was there, one day in 1946, that Roxburgh said goodbye. The wind was rustling the leaves so that some had fallen and were blowing across the paving: a weak sun was casting shadows round the fountain. "I am sorry," he said, "to leave Bart.'s. I've had a good time here: being emeritus isn't the same thing." For him it was the end of a chapter in a volume so packed with experience that even those who knew him quite well did not realise the fullness of his venturings.

Roxburgh was born at Valparaiso, Chile, on August 17, 1886: he was named Archibald Cathcart. In 1894 he was in Liverpool attending Greenbank School: he remained there for about two years and then his family moved to West Kirby in Cheshire. From 1900 to 1905 he was at Charterhouse and thence passed to Trinity College, Cambridge, where he was an exhibitioner and gained a first-class in the Natural Science Tripos. Having gained the senior entrance scholarship he entered Bart.'s in 1909, clerked for Dr. Norman Moore, and dressed for Mr. A. Bowlby, and followed the custom of the times by taking the final examination of the Conjoint Board in 1912. A year later he took the degrees of M.B., B.Ch.(Camb.). In 1912 he held the appointment of Pathological Clerk to Dr. Garrod, and in 1913 was Resident Anaesthetist for three months; from 1913-14 he was House Physician to Dr. Archibald Garrod, and during this time he and Miss Powell (Sister Mark) designed the temperature charts which Bart.'s has used ever since.

His career was interrupted by the First World War. On August 1, 1914, he became a Surgeon-Lieutenant in the Royal Navy. He was not released until 1919. In 1916 he married Mary, daughter of Lieutenant-Colonel J. A. Lambert of the Queen's Bays.

When Roxburgh returned to London, he became Chief Assistant to the Skin Department in 1919 and Hon. Casualty O.P. Surgeon at St. Paul's Hospital for Skin and Venereal Diseases: in the same year he obtained the diploma of M.R.C.P. (Lond.). From 1920-25 he held the appointment of Assistant Medical Officer in the Special Department. In 1921 he took the degrees of M.A., M.D.(Camb.), his thesis being "Gonorrhoea as seen in Public Clinics."

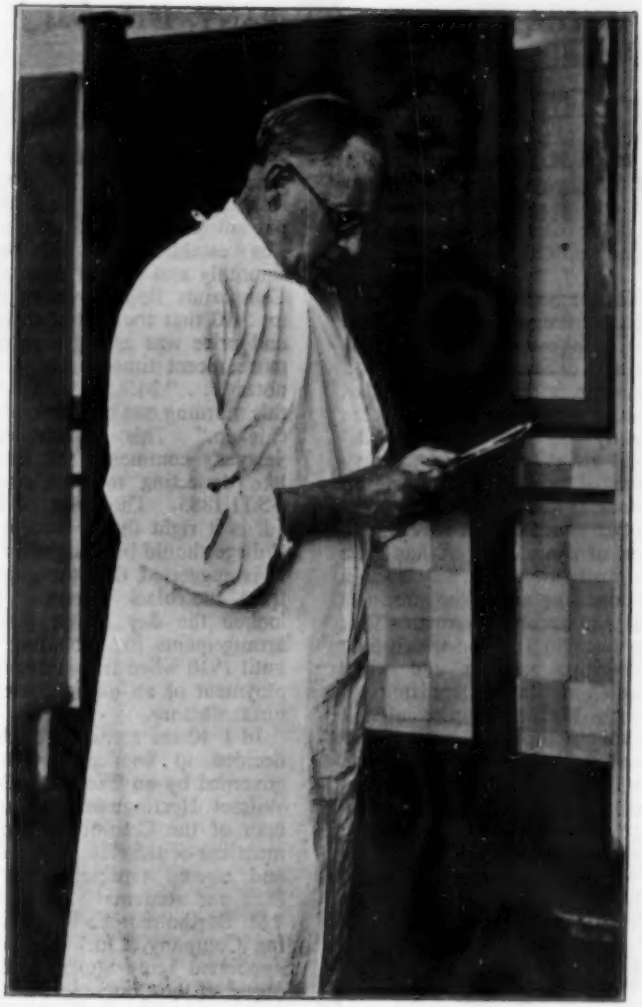
In 1924 he became Assistant Physician to St. John's Hospital for Diseases of the Skin and was soon promoted to the full honorary staff. In 1925 he visited Vienna and studied dermatology under Professor Kyrle, and in the same year became Dermatologist to the Royal Masonic Hospital. In 1927 Roxburgh became Assistant Physician to the Skin Department and a year later succeeded Dr. Adamson as Physician to that Department. Besides these appointments he held others at, e.g., Wembley Hospital and the Hampstead Hospital for Children. Somehow he found time to become Dean of the London School of Dermatology (1924-30), and to be Assistant Editor of the British Journal of Dermatology and Syphilis (1926-30), Hon. Secretary to the Section of Dermatology of the Royal Society of Medicine (1926-38) and Editor of the British Journal of Dermatology and Syphilis (1930-38).

In 1932 the first edition of his textbook, "Common Skin Diseases," was published.

Of the honours which came to him, one may note the diplomas of F.R.C.P.(Lond.) in 1929, the corresponding Membership of the Danish Dermatological Society (1930) and similar Membership of the Hungarian Dermatological Society (1935) and of the Belgian Dermatological Society (1946). He was President of the Dermatological Section of the Royal Society of Medicine (1943-45) and President of the British Association of Dermatology (1946).

During the Second World War he added to his responsibilities by becoming Consultant in Dermatology of Sector 3 in the E.M.S.

Many a Bart.'s man will remember the tall, white-gowned figure moving from case to case, talking, discussing, teaching, invariably courteous (every married woman he addressed as Ma'am), never ruffled, dealing efficiently with twice as many cases as most of us can deal with in a session. He will be remembered by many patients who returned to their homes comforted that they had obtained one of the best possible opinions concerning their difficulties: by



many practitioners who studied the brief notes written in his own hand which usually gave as much information as other men's more prolix communications: by his colleagues, for the soundness of his opinion, his quiet humour, his interest in golf, photography and archeology, and by Bart.'s men particularly because he set and demanded a standard in the highest possible tradition of a hospital which has very great traditions.

In 1949, when on a photographic expedition on Cairngorm, he suffered a coronary thrombosis; thereafter he took life a little more leisurely but was still much involved in private practice. He died in his consulting room in Harley Street, on Friday, December 3; his ashes were interred a few days later in Hampstead Parish Churchyard.

To his wife and daughter, and to his three sons (all of whom are Bart.'s men) we offer our sincere condolences at this time; our sorrow, being less personal, cannot be matched with theirs, but—without presumption—we may share with them the inspiration of his memory.

THE CATERING COMPANY, 1910 - 1953

by C. E. MORRIS

On January 1st, 1954, there passed quietly away an old, if not always respected, servant of the College and Hospital. There were few mourners. On this date the College Catering Company passed into the hands of the liquidator.

The reasons for the final liquidation of the Catering Company were primarily economic. The rising costs of labour and raw materials made it increasingly difficult to produce food profitably within the price range of most of the customers and while the record of the Catering Company was not particularly distinguished it had always attempted to carry out the function of providing food within very narrow financial limits to the best of its ability; during two world wars it never failed to produce food of some sort. It has been a matter of curiosity to many why such a Company functioned at all in the precincts of the Hospital and to appreciate this it is necessary to go back to 1843 on which date students first became resident and when "The Collegiate Committee entered into an arrangement with Messrs. Staples of the Albion Tavern for the supply of various provisions requisite for the students, considering it better in the first instance that the object should be tried with as little outlay as possible, under an arrangement of supplying the students with all necessary articles for domestic use, without their being purchased by the Hospital, thus affording an opportunity to the Committee to satisfy themselves with the exact cost of the establishment upon which they might found the charges to the students." . . . "The next point for consideration which the Committee viewed with very considerable anxiety was the appointment of a gentleman to the Office of Warden who would be resident in the Establishment and have the superintendence of the resident students, taking charge not only of the various matters that had been provided for their residence but to watch carefully their moral conduct. In this anxiety the Committee requested the assistance of the Medical Officers who were unanimous in recommending Mr. James Paget, Lecturer in Physiology at the Hospital, as a gentleman eminently qualified for the appointment."

It would appear that no particular provision was made for students who were not resident and it must be presumed that they patronised the local inns and restaurants. The establishment did not always run smoothly and it is of interest to note in the Complaints Book covering the period 1885 to 1910 that the matter of quality, quantity and price was as big a problem then as in more recent times. The Complaints Book notes . . . "24.7.1885. I had four eggs up this morning one of which contained a young chicken." This at least emphasised Bob Sawyer's comment that there is "Nothing like dissecting to give one an appetite." "5.11.1885. The price of faggots being a ½d. is it right that a student resident in the College should be charged 1d.?" "5.10.1904. It is suggested that the sugar be separated from the black beetles. This was overlooked the day before yesterday." These arrangements for providing food continued until 1910 when it was decided that the employment of an outside caterer had become unsatisfactory.

In 1910 the members of the Hospital staff decided to finance a Catering Company governed by an Executive Committee. Dr. Wilmot Herringham was appointed Chairman of the Committee which consisted of members of the staff, who were shareholders, and elected representatives of the Junior Staff and students. It was to be known as "St. Bartholomew's Hospital College Catering Company, Ltd." and Miss Virtue was appointed Lady Superintendent. The main object of the Company was to provide meals at a reasonable cost and without any intent of making large profits and it was agreed that any profits that accrued after the payment of expenses and the payment of the dividend, which was restricted to 5 per cent., should be paid over to the Students' Union.

No very great improvement in the quality of the food was noticed and the pattern of complaints appear to be similar to those between 1885 and 1910. "30.8.27. I suggest the stock of eggs be sold and only the post-war variety used. I have seen four specimens this week which are certainly not later than '07." "26.9.28. The resident staff are of

opinion that the food served is sufficiently unappetising without the addition of the following animals . . ." " 12.9.33. The cold beef with which I was served was green in parts. I complained and was told that it was due to the light." " 28.6.32. May I suggest that it is scandalous to charge 6d. for a slice of stuffed marrow $\frac{1}{4}$" thick when the cost of a 15" marrow is only 6d."

In 1935 the Medical College opened the pre-clinical school in Charterhouse Square and the Catering Company was called upon to start another restaurant to cater for the staff and students there. The Board of the Catering Company realised that the effect of this new restaurant would be to increase the overhead expenses for supervision and domestics without increasing the takings and they expressed grave fears as to the ultimate outcome of this new venture. The results of the first year's trading made it perfectly clear that their fears were justified. A substantial loss was made, aggravated by the fact that the pre-clinical school was keeping University terms and for many weeks of the year the expenses had to be met and no income was available. The slight profits which were made in the refectory in Smithfield were used to bolster up the refectory in Charterhouse. This problem was solved temporarily on the outbreak of war in 1939 when the pre-clinical school was evacuated to Cambridge and the Charterhouse refectory closed.

The Smithfield refectory continued to function during the war years with very little financial success, but at least it kept its head above water. On the return of the pre-clinical school to Charterhouse in 1946 catering was again started and in a short time the losses became a serious embarrassment to the budget.

From 1946 onwards the College was called upon from time to time to make contributions in order that the Company could continue to trade.

In 1948 the shares of the Catering Company were purchased by the College and the Students' Union and the board of management of the Catering Company was reconstituted. Outside catering experts were called in and a complete survey was undertaken both from the point of view of equipment and service. Emanating from the report submitted by the experts the kitchens of the Smithfield refectory were completely re-equipped and a modern canteen servery was installed. Outside catering firms were approached with a view to running the refectory but most of them turned it down out of hand and the only firm which was prepared to undertake the catering required a guarantee, which, together with their proposed very substantial rise in the price of food, would have resulted in the cost of the food served in the refectory becoming prohibitive. It was decided, therefore, that every economy should be effected and that small increases in price would have to be made in an attempt to balance the budget.

After the partial reorganisation and the introduction of such economies as were thought necessary the Company in 1949 made a small profit. In 1950, however, the ever mounting tide of costs produced a substantial loss and the College was called upon to provide further financial assistance. In March, 1952 the responsibility for providing lunches in Charterhouse Square was transferred to the College Hall. The relief of this burden from the Catering Company did not, however, substantially alter the total financial position, as by this time both refectories were making losses. The Board were very concerned with the financial position and reviewed the circumstances which were largely responsible for these losses. The Board felt that the conditions under which the Catering Company was then trading were such that future profits would be improbable. The decline in the student numbers, combined with unstable prices and greatly increased wages were largely responsible for this state of affairs and although the Company had exercised every economy it would not be possible to balance the accounts in the future without greatly increasing the prices. The Board felt that although the present liquid reserves might enable the Company to go on trading for a few more years liquidation was inevitable, but then might be compulsory and not voluntary, whereas if liquidation took place now it would enable the existing shareholders to receive their original investment.

The Students Union representative felt that the proposed liquidation was the obvious one, but expressed concern about the catering arrangements which would take the place of the existing Company. He was of opinion that the majority of the students felt that more pleasant surroundings and warmer food would be a vast improvement.

The Chairman of the Company expressed the view that it was not the Board's function to concern themselves with the arrangements that should be made for future catering and it was agreed that the Company should give notice to both the Hospital and the College that as from June 30th, 1954 the Company would no longer be in a position to provide food and service for house officers and other users of the refectory. A liquidator was appointed to wind up the Company.

Representatives of the College and the Hospital met early in 1954 to discuss the future catering arrangements and it was finally agreed that the College would continue to run a Catering Department, primarily for the benefit of students, but it would also provide lunches and teas for registrars and certain other people working in the Hospital. Agreement was also reached on a major scheme of redecoration and re-equipment, which will include covering the existing tiled walls with plaster and paint, laying a new floor and the installation of a modern lighting circuit.

It is also proposed to refurnish with small tables, this will make available a further 25 seats, and as the Senior Medical Staff have been provided with their own dining room and, in consequence, will not be using the refectory, more space will be available at lunch time.

To carry out this plan of redecoration and re-equipment it will be necessary to close the refectory for approximately 12 weeks and it will be closed as from January 3rd, 1955. During this period arrangements will be made to accommodate as many people as possible in the refectory in College Hall ; that some inconvenience will occur is inevitable but it is hoped that the final result will justify the closing down of the service during this period.

M.F.C.

by R.B.P.

On being inducted into the chair, the new Master of the Fountain Club reveals his clinical history.

When I was a lad of tender years
I studied all the prospects of the best careers ;
The medical profession seemed the one to choose,
And the Hospital I picked on was Bartholomew's.
I picked so wisely from the lucky tub
That now I am the Master of the Fountain Club.

I sat in the Rooms in a dirty white coat,
And Cunningham's Anatomy I conned by rote ;
My Anatomy professors were the best in Town,
And I learned my Physiology from Langdon Brown.
My keenness the examiners seemed loth to snub—
And now I am the Master of the Fountain Club.

I emerged in the wards, and served a term
As a clerk in the Herringham and Dropsy firm ;
I practised percussion, and I learned to cope
With that awkward apparatus called a stethoscope :
I percussed so firmly with rub-a-dub-dub
That now I am the Master of the Fountain Club.

Though surgeons should be born, not made,
One has to be apprenticed to the butchers' trade—
A retainer of ' The Baron ' I next became,
And Surgical Asepsis was my constant aim :
My finger nails so carefully I learned to scrub
That now I am the Master of the Fountain Club.

I now turned to Labour, and did " one month's hard "
Delivering multiparae with no holds barred :
' Mackenzies ' introduced me to a Mrs. Brown,
And I actively encouraged her in bearing down ;
And many a City mother owed her new-born cub
To an embryonic Master of the Fountain Club.

On leaving Bart's — as alas ! one must—
I now became afflicted with a wanderlust ;
I got myself entangled in the first World War
As a regular Lieutenant in the Doctors' Corps.
We managed so effectively the Huns to drub—
That now I am the Master of the Fountain Club.

The years rolled by, and now and then
I encountered in the Services some old Bart's men ;
I learned of the existence in a Soho pub
Of a famous institution called the Fountain Club.
I bribed the Clerk, and I paid my sub.
And became a humble member of the Fountain Club.

Perhaps I ought to mention that from time to time
I've indulged the harmless hobby of composing rhyme :
This hobby horse I rode so hard
I became a sort of acting unofficial ' Bard ' :
But a humble Bard — ay ! there's the rub —
Is a long way off from Master of the Fountain Club !

For years I sat " below the salt "—
My infant ambition had not learned to vault !
It was in fact a sensitive and shrinking plant
Content to be completely insignificant :
But I sedulously watered this wilting shrub,
And now I am the Master of the Fountain Club.

The famous Masters came and passed ;
Till the unexpected miracle occurred at last —
By some black magic of Beezelbub
I found myself the Master of the Fountain Club—
The butterfly emerged from the lowly grub,
And now I am the Master of the Fountain Club !

So new boys all pray don't despair
Of your chances of attaining to this lordly chair ;
If you wonder how these honours are distributed,
Here's a tip that comes directly from the Fountain head—
Be civil to the Clerk, and punctual with your sub.
And you all may be Masters of the Fountain Club !

The Journal wishes all its readers a

Happy New Year

TIME LAG

by Dr. R. M. B. MacKENNA

It is, one hopes, salutary to write an essay on the time-lag which all too often occurs between the first publication of an observation and the general recognition of the validity and importance of that discovery. In Medicine three or four examples come to mind and it is with these that this paper is concerned.

Bismuth is an element which has had an odd medical history which was well told by Hochradel (1928). It was not known to the Greeks or Romans. Basil Valentine, a German monk with a knowledge of alchemy, referred to it in 1450 as "wismut", and characterised it as a metal. Zedler in 1732 reported favourably on the use of bismuth inunctions, salves and plasters: he used an oil containing the metal for the treatment of cancer and fistula. Until the latter part of the eighteenth century bismuth salts were believed to be poisonous, and were scarcely used for internal administration. Odier of Geneva in 1803 was the first to advocate the use of a bismuth salt (the sub-nitrate) for gastro-enteritis; he believed it to be an infallible remedy for gripe, but he prescribed it in one grain doses with 10 grains each of magnesia and sugar. The new remedy fell into disrepute when Kerner (1829) published a paper concerning a case in which bismuth nitrate had been administered and the patient had died with the symptoms of metallic poisoning. Some half-dozen similar accounts were published but in 1841 Trousseau showed that these cases had died as the result of arsenic impurities in the bismuth. Thereafter, better methods of purification having been adopted, bismuth came to be recognised as a standard remedy for gastro-enteritis. The history of the medical use of bismuth so far is one in which the metal could not for many years be employed medically because the ancillary of chemical purification was incompetent to provide the physician with an uncontaminated product; It seems however that there was definitely a time-lag in its employment for the treatment of syphilis, for Goodman and Gilman (1941) state that although it "was first tried in human syphilis in 1889 it was not until many years later that the value of this metal was established." In 1916 Sauton and Robert investigating spirochaetosis of fowls considered that tartrobismuthate of sodium would be of use in the treatment of syphilis, but it was not until 1921 that Sazerac and Levaditi published their first paper which was destined to launch "bismuth" as a standard remedy for the treatment of the malady. The time-lag here was some 32 years.

The reader will note that many years elapsed between the recognition of bismuth as a chemical element and its application to medical purposes. The same thing, although the time-lag was shorter, occurred with D.D.T. which was first synthesised in 1874. Its toxicity to insects remained unsuspected until 1939 or 1940. In 1942 the British Military Attache at Geneva called the attention of our Government to the product which was being manufactured by the Geigy Company of Switzerland. The Director of Hygiene at the War Office was quick to realise the importance of the information particularly as he was concerned with the health of troops in countries where malaria and typhus were endemic. The German General Staff, although they were geographically in a much better position than we were to keep abreast of Swiss enterprise, appeared entirely to neglect the discovery: their allies, the Japanese, might well have been grateful if their own or the German Military Attache had realised the importance of D.D.T. Again there was a certain time-lag before we were able to issue the compound to hygiene and anti-malarial units: but the major time-lag was about 66 years.

The discovery of Penicillin was announced by Fleming in 1929 but it was not until 1940 and 1941 that its unusual properties were revealed when the Oxford workers succeeded in producing a stable extract of the active principle, and demonstrated by animal experiment and clinical use that penicillin belongs to what was then regarded as a rare class of drug — a true chemo-therapeutic agent. Jeffrey (1945) has stated that "it is a remarkable tribute to the original laboratory workers that, long before the drug was first used on any human patient, almost all the essential facts as regards the types of

infections likely to benefit and the dosage and technique of administration . . . had been worked out in the laboratory."

Difficulties in making the product on a commercial scale were overcome with remarkable skill, nevertheless the transfer from laboratory scale production to factory production caused some delay and in 1943 the Army Medical Department Bulletin stated that " supplies — of penicillin — are increasing though still limited by technical difficulties of production and purification. Generous allocations are made to the army as material becomes available but there is not yet sufficient penicillin for general use." From 1929 until 1943 represents a lag of 14 years ; it might have been much longer had research not been stimulated by war.

In 1936 MacCormac and Scarff published a very short paper of some 500-600 words concerning a benign tumour which they named "Molluscum Sebaceum ". It has since been called Kerato-acanthoma and also Molluscum pseudo-carcinomatosum. This cutaneous lesion has certain similarities with squamous-cell carcinoma and it seems likely that many cases previously diagnosed as epithelioma and dealt with as such were in fact examples of this benign lesion. Fouracres and Whittick (1953) stated that up to the time of their communication it had been the subject of only four papers, all by British authors. Certainly it was not until some two years ago that dermatologists, radiotherapists and surgeons woke to the realisation that molluscum and epithelioma had to be carefully differentiated, because — at the lowest estimate — the treatment of the two conditions is essentially different. Further they realised that Molluscum was the commoner lesion.

In regard to molluscum sebaceum the time-lag can be reckoned as 16 years which is somewhat similar to that which occurred with penicillin.

Mollusca is latin (first declension) for a soft walled nut, and although *Molluscum* (second declension) means the branch of a

Molluscum Sebaceum

tree (perhaps of the maple tree) the present author believes that the first word is regarded by etymologists as being the source from which the medical term "Molluscum" (e.g. molluscum contagiosum) is derived, but would not be surprised if some one with greater latinity attacks him concerning this. Be that as it may, a fully developed molluscum sebaceum has some slight suggestion of a soft walled nut the base of which is implanted in the skin. Most of the lesion appears to be clothed with normal skin but the upper part shows a rough, irregular, papilliform surface.

It is generally agreed that there are three stages in the evolution and spontaneous devolution of the tumour. The initial lesion is a papule which grows rapidly.. In about 6 weeks the tumour is fully formed. It is then 1-2 cm. in diameter and raised ½-1 cm. above the skin surface. For a further 6 weeks the nodule remains as it is, except that it may become softer and flatter. Then retrogression commences and it disappears slowly, leaving a scar. The whole process is completed in 4-6 months. The proximal lymphatic glands are not enlarged.

MacCormac and Scarff regarded the central area of the face as the site of election: there have been reports of lesions occurring elsewhere.

Diagnosis depends on the history, the appearance, and the histo-pathology. Both the clinician and the pathologist require a good deal of experience to differentiate between epithelioma and molluscum sebaceum. Ablation, curettage, followed by cauterization of the base, or radiotherapy are the recognised methods of treatment.

Finally the following story may perhaps be included in this small series.

For many years physiologists, dermatologists and others lamented that perfusion experiments — which have yielded such important knowledge concerning the intermediary metabolism of the kidneys, liver, thyroid, intestines and adrenal glands — are not possible in the mammalian skin because the integument is supplied by small arterial branches of a deep cutaneous arterial plexus and there is no area of skin sufficiently large which is supplied by one single artery .

In 1938, however, Malmejac and Desanti called attention to the fact that the skin of the upper hind limb of the dog is readily detached and receives its arterial supply from a distinct isolated saphenous artery ; this made it possible to study cutaneus circulation in the area of dog skin by cannulating the saphenous artery and vein.

Thirteen years later, Feldberg and Patton noted a somewhat similar arrangement in the cat. Their report contains no reference to Malmejac and Desanti's work.

So far as dermatology was concerned, however, it was not until February 1954 that a report was received confirming the original observation in the dog and that widespread recognition was suddenly given to the importance of the finding .

Malmejac and Desanti found the saphenous artery in dogs in 50 dissections and were unable to find an analogous artery in man. Kjaersgaard (1954) has now confirmed this original observation and has given the following details concerning the operation : under anaesthesia (intravenous nembutal) the medial aspect of the upper hind limb is shaved and an incision made parallel but 2 cm. distal to the groin. This incision extends from the anterior to the posterior border of the limb. Incisions are now made down the borders of the limb past the knee joint to the upper third of the leg. An area of skin about the size of a man's palm is thus mapped out. The upper half of the skin is detached from the subcutaneous tissue by a slight pull ; the saphenous artery, vein and nerve are seen embedded in this tissue ; the branches given off from the lower parts of the artery and vein supply the detached skin area. These vessels are dissected free, ligated and cut distally to the ligation midway between knee and groin. Occasional small branches to muscles are ligated ; oozing from skin edges is controlled by coagulation or ligatures. Dissection proceeds from above downwards until the area below the knee is reached. The saphenous vessels supply the skin and vessels of the lower leg so that they have to be ligated and the skin flap is cut off 2 cm. below the knee.

Immediately after removal of the skin, it is fixed with clamps and rubber bands on a supporting frame and placed in an incubation box under constant temperature and humidity. Cannulae (hypodermic needles No. 18 and 20) are inserted into the upper parts of the saphenous vessels and perfusion is immediately begun. Because the lower parts of these vessels have been ligated the blood will be forced to circulate through the cutaneous branches only and return through the accompanying venous system of the same area.

Kjaersgaard used heparinized dog blood for perfusion and has conducted experiments for more than three hours.

The preparation of skin thus described may be employed in studying different aspects of skin metabolism e.g. (1) the fate of material added to the arterial blood may be studied by analysis of the venous blood; (2) material added to the arterial blood may be carried to the skin by diffusion, secretion or excretion through glandular or epidermal activity and may be recovered there either unchanged or in the form of metabolites; (3) percutaneous absorption can be studied by applying material to the cutaneous surface and analysing the venous blood; Kjaersgaard believes that such studies can most easily be carried out with the use of radio-active tracers.

The time-lag in the last example is 16 years. The reader is invited to draw his own conclusion from these eventful histories; the author would like merely to suggest to research workers that they might be well advised to study the literature of their speciality published some 15 years ago if they want to discover some really good subject to investigate.

REFERENCES:—

Feldberg, W., and Patton, W. D. M. J.Physiol., 1951, **114**, 490.

Fleming, A. Brit.J.exp.Path., 1929, **10**, 226.

Fouracres, F. A., and Whittick, J. W. Brit.J.Cancer, 1953, **7**, 58.

Goodman, L., and Gilman, A. The Pharmacological Basis of Therapeutics, 1941, New York:

Hochradel, J. Münch.Med.Woch., 1928. **75**, 177.

Jeffrey, J. S. Medical Annual, 1945, Bristol, John Wright & Sons Ltd.

Kerner, J. Heidelb.Klin.Ann., 1929, Vol. 5.

Kjaersgaard, A. R. J.invest.Derm., 1954, **22**, 135.

MacCormac, H., and Scarff, R. W. Brit.J.Derm. & Syph., 1936, **48**, 624.

Malmejac, J., and Desanti, E. C.R.Soc.Biol. Paris, 1938, **127**, 542.

Odier, L. Manual of Pract.Medicine, Geneva, 1803.

Sauton, B., and Robert, A. E. Ann.Inst.Pasteur, 1916, **30**, 261.

Sazerac, R., and Levaditi, C. R.Acad.Sci., Paris, 1921, **172**, 1391.

Trousseau, A. Traité d. Thérap. et de Mat. Med., Paris, 1841, **2**, 773.

Zedler, J. H. Grosses Universal Lexikon aller Wissenschaften v. Kieneste, 1732-1750, 64.

SO TO SPEAK . . .

On a Neurological Round:

She saw her doctor who advised her to consult you, sir—she then became weak in the legs.

STATISTICS, MEDICINE, AND BART'S

by M. P. CURWEN

A recent editorial in the JOURNAL attributed the foundation of the science of statistics to a certain Professor Achenwall, who lived in Göttingen 200 years ago. In fact, Dr. Achenwall is remembered only as the earliest recorded writer to have used the word "statistics" in more or less its present meaning. Both the word and the science have a history of much more than two centuries. To the Elizabethans a "statist" was one versed in affairs of state, perhaps a civil servant, and in any case capable of handling figures.[1] The science of statistics, which is essentially the science of counting, is as old as civilisation; the censuses we read of in the Bible were statistical investigations in precisely the same way as are present-day censuses. We have no information of any application of statistics to medicine in antiquity, but presumably Caesar knew roughly how many of his legionaries were disabled by sickness. In this country the earliest body of medical statistics is usually considered to be the Bills of Mortality; in the reign of Henry VIII all the parishes in London were required to render returns showing the numbers of burials each week. The figures were given under two diagnostic headings, "plague" and "other," thus providing a valuable index of the prevalence of a disease which was endemic in London for so many years, and enabling the nobility and gentry to escape to their country seats when life in the capital became too hazardous.

But it was not until the nineteenth century that the statistical approach was generally recognised as having anything to offer to medicine as a science. It is just over a hundred years since the whole machinery of death registration was instituted, and William Farr was appointed medical adviser to the Registrar General with the task of analysing year by year the data derived from death certificates. In the field of public health the story of John Snow and the cholera epidemic of 1854 is too well known to need repeating. In the hospital world Florence Nightingale was among the first to recognise the importance of statistics. Coming back from the Crimea in 1856 she was soon to discover that conditions in civil hospitals were often little better than in the military hospitals abroad. If matters were to be improved the facts must be known; and facts meant statistics.

It was largely as the result of Florence Nightingale's campaign that the Treasurer of this Hospital appointed Dr. G. N. Edwards as Registrar in 1860. The Treasurer's preface to Edwards's first *Statistical Tables*, which has already been quoted in these pages, provides such an admirable statement of aims that I give it in full:

> In the year 1859 application was made to me, as Treasurer, for statistical information regarding the patients received into ST. BARTHOLOMEW'S HOSPITAL. I very much regretted my inability to comply with the request to the extent required, from want of sufficient data. After much careful consideration of the matter, I saw how extremely important it was that this Hospital should be in a condition to furnish not only to the Governors, but to the Medical Profession and Society at large, the important facts of Vital Statistics which such an Institution can alone afford. This could only be done to the fullest extent by a skilled and competent officer. Accordingly I at once brought the subject before the Governors, who most readily assented to the appointment of a Registrar, whose first year's work and experience is now placed in their hands, and doubtless they will be gratified with the amount of information conveyed, and the admirable manner in which Dr. Edwards has performed his duty, the subject demanding his constant watchful attendance. Large as is the information afforded, yet the next Report will be fuller, as it is intended that the occupations in life of the patients, as well as the duration of time each remained in the Hospital, and the positive number of operations performed under Chloroform, with their results, shall be given.
>
> In conclusion, I desire to direct the attention of the Governors to the fact that, whereas the mortality in the Hospital during the year was 623, no less than 82 of this number died within twenty-four hours after their admission.
>
> WILLIAM FOSTER WHITE,
> *Treasurer.*

Dr. Edwards, aged only 30, was elected assistant physician in the same year that he was appointed Statistical Registrar (for this is how he describes his title). In 1865 the

[1] In *Hamlet* (Act V, sc. ii) we are told that statists considered it bad form to have good handwriting; did this apply also to doctors?

St. Bartholomew's Hospital Reports first appeared and Edwards became Joint Editor. The first volume contains an account of his duties; they were evidently fairly onerous, for he seems to have been personally responsible for the upkeep of the registers kept in each ward, in which were recorded the diagnostic and other details concerning each patient. Indeed, in 1863, it was found necessary to appoint an additional registrar to deal with the surgical side; otherwise, he writes, he would have had no time for any other work at all. At this time the *Reports* also contain much that is of statistical interest. The volume for 1869 opens with an obituary of Edwards, who had died that year, having been elected physician two years earlier. The compilation of the statistical tables is recorded as being his most important contribution to medicine. A few pages later we find a most interesting analysis of the midwifery statistics of the Hospital for the years 1862-1868. During this period the maternal mortality was 21 out of 5,734 deliveries[2] (it is not stated how many of these took place inside the Hospital). But perhaps most interesting of all, although the subject is not strictly medical, is an article by Sir James Paget, in which he gives an account of a follow-up of a thousand of his students. Of these, he writes:

> 23 achieved distinguished success.
> 66 „ considerable success.
> 507 „ fair success.
> 124 „ achieved very limited success.
> 56 failed entirely.
> 96 left the profession.
> 87 died within twelve years of commencing practice.
> 41 died during pupilage.

The "died in practice" group includes William Palmer, the poisoner, who was sent to the gallows for murder; of him Paget wrote, somewhat savagely, "He was an idle, dissipated student, cursed with more money than he had either the wisdom or the virtue to use well". Less comprehensible to us today is the account of an elaborate investigation undertaken to show that the mortality rate after amputations was no worse among townsmen than countrymen and no worse at Bart.'s than in various country hospitals, to some fifty of which the author had sent a questionnaire.

But to return to the *Statistical Tables;* the series continued from 1860 until 1932 with only one break: the *Tables* for 1916 were compiled but never printed. After the first few years the enthusiasm waned; the form became stereotyped and there are few tables with real statistical interest. The explanation is perhaps this: once the Listerian revolution was complete, there was no general hospital problem to be solved, only the separate problems of individual diseases. Wholesale hospital statistics of the sort envisaged by Farr and Florence Nightingale could shed little light on these, and conditions were not yet ripe for the more specific investigations which will be considered later in this article. Concurrently with the change of attitude was the gradual adaptation of the *Tables* into an index to the clinical records themselves, and by 1921 this aspect had become predominant. In view of the curious history of the word "registrar" it is perhaps worth recording that until 1920 the *Tables* continued to appear under the authorship of "The Medical Registrar" and "The Surgical Registrar." In 1921 the authors appear as "First Assistant of the Medical Unit" and "First Assistant of the Surgical Unit"; under these new titles are the names of Dr. George Graham and Mr. R. Ogier Ward. But this post-war series only lasted until 1932,[3] by which time there were evidently too many other claims on the time of the first assistants and the tables went by default. (One of the last compilers has described to me how he used to spread all the index cards out on his drawing-room floor and proceed to play a vast game of patience with them).

When the problem of statistical tables came to be considered in the re-organisation after the last war it was felt that new methods were necessary, and in 1947 the Department of Medical Statistics (under Mr. J. A. Heady) was set up. The department remains the only one of its kind among the London teaching hospitals. It was housed, where it still remains, in the North-West corner of the old Rahere ward.

The three chief aims of the new department are set out in its first Report:

[2]There were no maternal deaths among some 3,000 hospital deliveries in 1949-53.

[3]Although an isolated volume appeared for 1936.

(i) Indexing the records from various points of view, thereby making the clinical experience of the hospital, as recorded in the notes, available as conveniently as possible.
(ii) Production of tabulations both annually and as required.
(iii) Provision of technical advice on the planning and analysis of experiments and enquiries.

In order to fulfil the first two of these aims it was decided to make use of the Hollerith punched card system. According to the popular conception this is something that enables the records of all diabetic left-handed french polishers suffering from Menière's disease to be revealed by the mere pressing of a button. In essence this is not far wrong; it is only a picturesque way of saying that punched cards provide a multi-axis index. But there is a great deal more to it than that. First the information has to be collected; about 12,000 in-patients are discharged in a year, and we have to ensure that the notes of each are passed to the department for coding; that is to say translating into figures the details recorded on the "front sheet." Of these the most important is the diagnosis, which has been entered by the registrar (as we must call him again; but he is now one of thirty or more). The figures are transferred to cards measuring about 8 in. by 3 in. in the form of holes punched by a simple keyboard machine no bigger than a typewriter. From these are compiled the annual diagnostic index and the annual *Statistical Report* which, in 1947, replaced the old *Tables*.[4]

Before discussing the provision of technical advice, we must go back to the wider world and look for a moment at the contributions made by statistics to medicine in the last hundred years. To the sanitary reformers of the nineteenth century statistics meant little more than tables of figures; no special techniques were used in their interpretation. The statisticians were, first and foremost, fact-finders, and the facts they found were usually so startling as to speak for themselves. In a report on the health of the army, Florence Nightingale showed that the death-rate in the Knightsbridge barracks was 17.5 per thousand, compared with 3.3 for the whole borough of Kensington. It was on such facts that the campaigns for improved sanitary conditions were based. In the realms of pure science different forces were at work. Darwin's "Origin of Species" was published in 1859 and a few years later Mendel's work first appeared. Both these revolutions implied the quantitative study of living material, and for these purposes mere enumeration was not enough. The mathematical theory of probability, which had exercised philosophers (and gamblers) for two hundred years or more, was suddenly found to have a new and practical importance. Francis Galton was among the first to realise this, and his pupil, Karl Pearson, working at University College, developed some of the statistical methods necessary to follow up the work of Darwin and Mendel. But Pearson's methods were still not suitable for most branches of medicine, and it was not until R. A. Fisher, working at the Agricultural Research Station at Rothampsted, introduced a new conception of the role of statistics in experimental science, that real advances could be made. It would be out of place even to summarise Fisher's teaching, but two main points can perhaps be selected: Fisher taught us the importance of planning experiments and he showed us how to extract the maximum information from small numbers.

In the fields of clinical medicine the opportunities for planned experiments do not occur as often as the statistician might wish; much medical research is of necessity a by-product of clinical practice. But both the planned and the unplanned type of research bring their special difficulties to the statistician. In a formal clinical trial, of the type with which Professor Bradford Hill and the M.R.C. have made us familiar, one of the problems is to design an experiment which will reduce to a minimum all possible sources of bias, whether of known or unknown cause; once this is done the interpretation of the results is usually relatively easy. In an unplanned investigation, based for example on existing records, there is the more difficult task of determining the possible sources of bias from internal evidence. It should be pointed out that in this context the word "unplanned" is used in no deprecatory sense; a serious investigation can hardly be carried out in a haphazard fashion.

It is in interpreting such ideas to those engaged in experimental medicine that the Department of Medical Statistics at this

[4]Full details of our methods are given in the Appendix to the 1951 *Report*.

Hospital fulfils its third aim. The range of subjects on which we have been consulted is wide, and it is difficult to give examples. Among some of the more out-of-the-way problems have been the institution of an equitable method of scoring for the students' rifle club and the interpretation of some observations made at Monte Carlo by a member of the consultant staff. (All statisticians are asked, at the rate of about once a week, how to make money on the football pools ; doubtless we could set the Hollerith machine to calculate permutations). But I would like to end by describing the first investigation in which we did more than offer advice, an investigation in which the Department was associated on equal terms with the clinicians.

During the ten years before the last war, Mr. Geoffrey Keynes and others started treating cancer of the breast by conservative surgery combined with irradiation, in place of the radical mastectomy favoured by most surgeons. Thus the surgical practice of the Hospital constituted the nearest approach to a controlled trial that might be expected in this field, where ethical considerations alone are probably sufficient to preclude any stricter form of control. During the ten years about a thousand new cases of carcinoma of the female breast were seen in the Hospital and in spite of the dislocations of the war the Follow-up Department only lost trace of thirty of these women from the time they left hospital until 1951. Our first task (by no means an easy one) was to extract all the relevant details from the notes and to record them on forms drawn up for the purpose. From these forms cards were punched in exactly the same way as described earlier. The analysis of material of this sort, where so many factors are involved, calls for a special type of Hollerith machine, (whose mechanical rattle many will have heard as they passed the window of what was once the Rahere bathroom). Without some such help it would be almost impossible to calculate survival-rates, corrected for age, for all the combinations of factors likely to be relevant. I am not concerned here with the results of this investigation, which have been published elsewhere ; the point I want to make is that surveys such as this are essentially joint projects. Only the clinical departments know what questions need answering ; we in the Statistics Department can supply the mechanics and help to interpret the results.

Conclusion. I have attempted to trace the impact of statistical ideas on medicine over the past hundred years, and to show how this has been reflected in the work of one hospital. To do this in the space of a short article I have had to miss out much that is important, but I hope I have said enough to prove that something has been gained by the association of Statistics, Medicine and Bart's.

NUCLEIC ACIDS AND DISEASE

Knowledge of the specific metabolic disturbances of the cell in disease is still very lacking, and knowledge of the normal basic machinery of the cell is also very incomplete. Hence our range of specific drugs is at present limited and it is still not possible, *a priori*, to design a molecule to correct the disturbance produced in any particular disease. There is now, however, increasing interest in the interpretation of disease at a molecular level, and the study of nucleic acids has, naturally, received particular attention because of their predominant rôle in the workings of the cell. There is strong evidence, for example, that the secret of the cancer problem lies in the detailed structure of the nucleo-protein complex of the nucleus. There is also evidence that the metabolic cell disturbances due to viruses (and to bacteria to some extent) are due to the addition of a foreign nuclear protein to the cell. When the cancer problem is viewed in this way some carcinogenic substances, certain carcinogenic viruses and a possible inherited cancer susceptibility factor all find common ground in nucleo-protein. Further cancer and virus research may be expected to benefit one another in correcting nucleo-protein disturbances.

Structure and functions of nucleic acids.

Two principal types of nucleic acid are found in living cells, desoxyribonucleic acid (DNA), restricted to the chromosomes of the nucleus, and ribonucleic acid (RNA), present in the nucleolus and the cytoplasm.

DNA in higher cell forms is associated with basic simple proteins. In animal somatic cells they are histones (molecular weight 14,000 to 20,000). They are not known to have any specific biological function. The difficulty of isolating nucleo-protein protein from the nucleus of a fixed composition, (1), and the ultra-violet microspectrophotometric observations of Caspersson, (2), on the living cell have led to the conclusion that nucleo-protein is not a definite unit in the cell nucleus. The marked biological activity found in pure protein-free DNA in recent years has now turned attention more to the nucleic acid part of the complex.

Detailed analysis of the DNA of the chromosomes has been carried out in the hope of relating genetic specificity to structure, (3, 4, 5). Remarkable results were obtained. Firstly, the old " tetra-nucleotide " theory was disproved whereby each unit of nucleic acid was supposed to contain one molecule each of the two pyrimidines, cytosine and thymine, and of the two purines, adenine and guanine. Secondly, the molar proportions of guanine and cytosine, and those of adenine and thymine, were shown to be equal in DNA from a variety of sources. Thirdly, the relative proportions of these two pairs varied widely and was characteristic of the source (6).

The X-ray diffraction spectra of isolated DNA, (7), and the DNA of active transforming principle of bacteria, (8), indicate a spiral molecular structure. Watson and Crick, (9), proposed that two molecules intertwine as a double helix with purine bases hydrogen bonded to pyrimidines (guanine to cytosine and adenine to thymine). (Fig. 1.) The analytical results are explained because these are the only pairs of bases that can, sterically, fit the model. Electron micrographs of DNA fibres confirm this, showing a mean width of 20A° consistent with two intertwined molecules (10, 11).

The model provides a ready explanation of how DNA duplicates. If one half of the helix separates, the preformed bases can only unite in a definite complementary manner in order to complete the fibre. Also the cross-over of chromosomes in meiosis may be explained as due to the overlap of two halves of the fibre already undergoing duplication.

The structure of RNA is only just beginning to receive the attention it deserves. RNA has a more general distribution than DNA. Schneider's analysis of the centrifuged fractions of rat liver homogenates, (12), showed that of the total RNA of the cell the nucleolus contains about 14 per cent, the mitochondria 8 per cent, the microsomes 54 per cent, and the cell sap 24 per cent. Recently, Chargaff, (13), has improved methods of extraction and analysis and shown for cytoplasmic material that the bases are in the same molar proportions (but with uracil taking the place of thymine) as for DNA so that the same helical structure is indicated, (9b). X-ray data are not yet available to confirm this. RNA from the nucleolus, however, shows a ratio of these

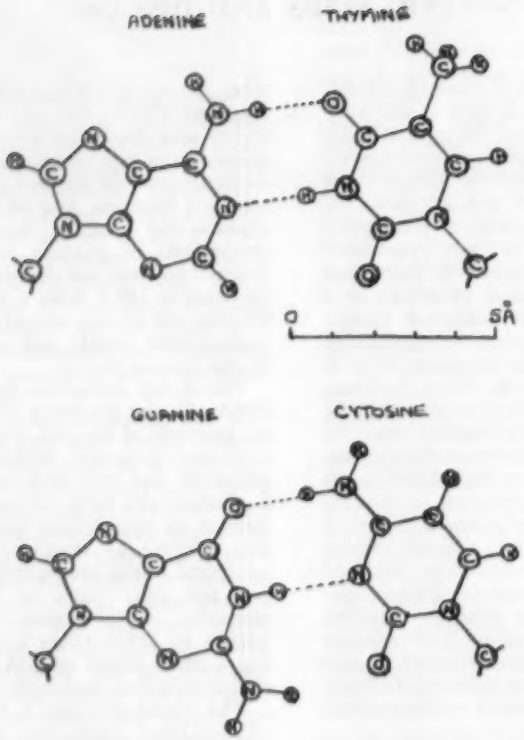


Fig. 1a. Hydrogen bonding of purine and pyrimidine bases.

Fig. 1b. Structure of DNA. Phosphate-sugar chains as ribbons, the pairs of bases as vertical lines.

bases different from unity but hydrogen bonding in the helix can still occur. The analysis of DNA and RNA from the same source were compared but no decision could be made as to whether the DNA serves as a "template" for the synthesis of RNA or *vice versa*.

Up to quite recently it has been assumed that the DNA of the chromosomes was the only genetic substance in the cell. There are now indications that RNA may also have genetic activity. Firstly, this is implied by the similarity of structure of the two nucleic acids. Secondly, the eggs of the echinoderms *Asterias forbesii* and *Arbacia punctulata* have been found to contain no DNA as determined by the Feulgen staining and ^{14}C labelled thymine studies (14). Thirdly, some organisms show cytoplasmic inheritance by plasmagenes, (15), and, fourthly, the smallest (less than 42 mμ diameter) viruses have so far been shown only to contain RNA. (Table 1.)

The DNA of the chromosomes, once formed, has a slow turnover rate indicating that it plays perhaps a passive, guiding rôle in cell metabolism. In fact, the average amount of DNA of mature cell is so constant, that it is useful for reference in the analysis of other cell components (16, 17). Haurowitz, (18, 19), has shown that in contrast with DNA the RNA content varies with the activity of the cell, e.g. it is high in active secretory cells. The evidence for an association of rapid protein synthesis with high RNA content, (20) is conflicting since if the rat intestine is treated with X-rays the turnover of RNA and DNA is greatly reduced without affecting protein synthesis (21).

Nucleic acids and the cancer problem.

There is a considerable amount of evidence to show that the primary change in the cancer cell is in the nucleus. Firstly the cancer cell shows evidence of a mutation since its characteristic uncontrolled divisions and powers of infiltration are transmitted through numerous generations. Also, certain human tumours, e.g. multiple neurofibromata, show Mendelian inheritance. Amongst animals, some incompatible crosses of fishes can result in melanomata (22). Secondly, in tumours produced by massive doses of X-rays or alkylating agents of the mustard gas type, chemical reaction with the DNA of the chromosomes can be demonstrated. Clearly, too, the purine and pyrimidine analogue type of cytotoxic and carcinogenic agents act by interfering with nucleic acid synthesis. Often, these carcinogenic substances show marked mutogenic activity, e.g. nitrogen mustard greatly increases the mutation rate of *Drosophila* (23). These substances also abundantly produce the abnormal mitotic figures seen in tumour tissue indicating the nucleic acid of the chromosomes (particularly of the heterochromatin region, (24)) is primarily affected. Thirdly, micro-injection of carcinogen treated cytoplasm does not cause cancer changes in the cell (25, 26). Fourthly, it

Table 1. DNA and RNA contents and size of viruses
(Per cent. of dry weight). (38, 39).

VIRUS	DNA	RNA	MEAN DIAMETER mμ
Animal Viruses			
Poliomyelitis	—	+	15-25
Louping ill	—	+	15-25
Equine encephalomyelitis	—	4.4	42
Shope papilloma	8.7	—	44
Rous sarcoma	—	10.0	70-80
Influenza A (PR8)	1.5	+	100
Influenza B (Lee)	1.2	+	100
Molluscum contagiosum	+	—	150-200
Vaccinia	5.6	?	240
Bacteriophage T2	37	—	(Head) 60
Plant Viruses			
Tobacco necrosis	—	17	17
Turnip yellow mosaic	—	35	20
Tobacco mosaic	—	6	15 × 300

is reasonable to suppose that in virus induced tumours, e.g. the Rous fowl sarcoma, papillomata of rabbits, and breast cancer of mice, the cancer change is due to injection of the virus nucleic acid into the cell with consequent profound disturbance of metabolism.

On the basis of the nucleic acid approach, several theories of carcinogenesis have been proposed in recent years. The "mutation by gene loss" theory suggests that an enzyme controlled by the gene is lost leading to accumulation of substances essential for cell division. In *Neurospora*, (27), an alternative metabolic pathway has been found for oxalic acid resulting in its incorporation into nucleic acid. Loss of an essential enzyme of the usual path would result in increased nucleic acid synthesis, a necessary condition before division can occur.

Haddow, (28), found that injection of the natural pigment xanthopterin into the rat caused proliferation of renal tubular epithelium. A xanthopterin oxidase is present in the cell and presumably controls the accumulation of this substance. The loss of such an enzyme can result in a cancer-like change. Similar growth-stimulating substances are present in liver and bone undergoing hypertrophy.

Although the turnover rate of DNA is much slower than RNA it is possible that the breakdown pathway differs from the synthetic one. Loss of an essential enzyme of the breakdown path would lead to excessive accumulation of DNA and so, to increased cell activity and division. The introduction of foreign nucleic acid into the cell by a carcinogenic virus could provide a more rapid path for the synthesis of DNA.

As is discussed below, carcinogens frequently show a marked depolymerising effect on DNA by destroying hydrogen bonds between adjacent molecules. The occurrence of this in the chromosome DNA, particularly in the heterochromic region, could account for premature division and the production of abnormal mitotic figures.

The discovery of the mustard gas derivatives (Fig. 2) of simple structure and effective against some malignant cells, has provided an enormous impetus to cancer research. Also, detailed study of their structure has emphasised even more the part of DNA in carcinogenesis. The early finding that marked cytotoxic activity depends on a minimum of two halo-alkyl groups in the molecule led Haddow (29) to suggest that their action was to cross link adjacent DNA molecules. Detailed physico-chemical investigation, however, showed these and other cytotoxic agents (including X-rays) depolymerise DNA, causing a marked drop in viscosity with no great decrease in molecular weight, rather than polymerise it (30). It is probable that these agents destroy hydrogen bonds between molecules. Later work showed monofunctional mustard gas derivatives (Fig. 2) were cytotoxic to some extent and the ability to form an electrophilic carbonium ion (Fig. 2) is thought to be required for cytotoxicity. These substances have no appreciable effect on the enzymes of the cell at the concentrations required for their action (31).

The cross-linking theory, however, stimulated a search for other difunctional alkylating agents. Several substances used in the German wool and rayon industry for cross-linking fibres to minimise shrinking were found to be cytotoxic. 2, 4, 6-triethylene - imino - s - triazine (triethylene melamine, T.E.M.), (Fig. 2), was found to be at least as effective as nitrogen mustard in Hodkin's Disease, less toxic, and could be given by mouth. Haddow (32) synthesised a series of dimethane sulphonoxy alkanes (Fig. 2) of which Myleran (GT41, 1, 4, dimethane sulphonyloxy butane) proved particularly effective for certain leukemias. Another group of cytotoxic substances act as anti-metabolites, interfering with the synthesis of DNA. Urethane (Fig. 2) may act by competing with a natural amine in the biosynthesis of nucleotides (Haddow and Sexton (33)). This substance has low toxicity but its clinical value is doubtful. The folic acid antagonists, e.g. aminopterin (Fig. 2) act by replacing an active form of folic acid (the citro-vorum factor) which is essential for DNA synthesis. They are useful in acute leukemia.

The alkylating agents were first called "radiomimetic" because some of their effects appeared similar to those of X-rays, e.g. they are both cytotoxic in small amounts, carcinogenic in large amounts, produce abnormal mitoses and mutations, sterility of the genital organs and reduce the viscosity of DNA solutions. The reaction mechanism for X-rays, however, is different. In aqueous solution $H^{\cdot}$ and $OH^{\cdot}$ free radicals are produced and in the presence of oxygen

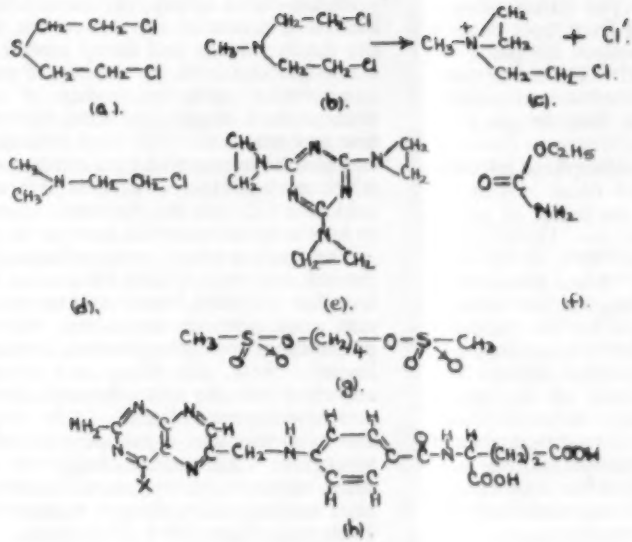


Fig. 2. (a). Sulphur Mustard, (b), Nitrogen Mustard, (HN_2). (c). Ethyleneonium Ion of HN_2.
(d) Monofunctional HN_2 Derivative. (e). T.E.M. (f) Urethane
(g) Myleran. (h). Folic Acid Antagonists. Folic Acid, X = OH, Aminopterin, $X = NH_2$

also the $HOO^{\cdot}$ radical and these are responsible for the depolymerisation of DNA (34). No depolymerisation occurs with solid or frozen DNA or if protecting substances like cysteine are present. The depolymerisation can be brought about by the same free radicals produced by U.V. light or by hydrogen peroxide and ferric iron salts. Excessive X-ray doses cause release of ammonia and phosphate and the formation of urea and oxalic acid. Depolymerisation of DNA has been shown *in vivo*, in irradiated rats and the mortality was found to be related to the degree of depolymerisation (35, 36).

This work suggests that carcinogenesis is the result of the breakdown of intermolecular forces between adjacent DNA molecules. The change is thus a steric and not a chemical one and it is therefore not surprising that no chemical changes have been detected in DNA from tumour tissue.

Nucleic acids and viruses.

The advent of paper chromatography and of more efficient means of separating the virus from the host (e.g. protamine sulphate precipitation followed by treatment with trypsin (37)) has allowed a number of analyses of viruses to be carried out (Table 1). In general, as far as the results go at present, it seems that plant viruses contain only RNA, bacteriophage only DNA, the larger animal viruses possibly both RNA and DNA, the small viruses (42 $m\mu$ or less) only RNA. However, further work is required before any real generalisations can be made. It seems plausible that below a certain size (about 42 $m\mu$) and degree of organisation the DNA mechanism of genetic transfer does not exist and reliance is placed entirely on the genetic properties of RNA. The large vaccinia virus (240 $m\mu$) shows a central nucleus-like core of DNA (40).

The carcinogenic viruses are of special interest. According to the present estimations (Table 1) the Rous sarcoma virus contains only RNA as, also, does the mouse milk factor (41) while the rabbit papilloma virus contains only DNA. Presumably where virus RNA is introduced into the cell metabolism is directly modified whereas if DNA is introduced corresponding, abnormal RNA is first synthesised which then produces the

metabolic disturbances. The bacteriophages T2, T4, T6 which infect Esch. coli, contain 5-hydroxy methyl cytosine in place of cytosine in the DNA, (42). The molar ratio of bases already described is maintained, however, with the new base in place of cytosine.

The mechanism of bacteriophage infection has been studied in great detail (43) in the hope of understanding the mode of action of animal (and plant) viruses. Hershey and Chase (44) labelled the DNA of T2 with ^{32}P and the protein with ^{35}S and showed that in infection of Esch. coli, the tail with its labelled protein attaches to the bacterial wall and the contained DNA is squirted into the cell with a syringe-like action. The 5-hydroxy methyl cytosine of the phage DNA completely upsets bacterial metabolism. Bacterial DNA is broken down and the cell machinery used to synthesise a large amount of phage DNA. After a short time the bacterium is lysed and new bacteriophage particles are released.

Bacteriophage-like activity is seen in a number of virus infections of animal cells. After some hours scattered "inclusion bodies" are visible in the cell which electron microscope studies show to consist of immature virus particles in a matrix of RNA (45). At this stage, as with bacteriophage, there is an "eclipse period" during which the infectious titre is reduced. The distribution of the virus in the cell is variable and according to Hydén (46) viruses containing DNA increase protein synthesis either in the cytoplasm (Molluscum contagiosum) or in the nucleus (infectious warts), while viruses containing RNA (Poliomyelitis, Louping ill), produce intranuclear granules containing RNA and protein.

Bittner (47) showed that the incidence of breast cancer in mice was increased in low incidence strains by foster feeding from a mother of a high incidence strain. Electron micrographs of the milk and other tissues show abundant particles (48) and these have typical virus properties (49). The virus appears to infect only the milk and not through the placenta and then to be dormant till maturity. Human milk contains somewhat less definite particles most frequently in subjects with a family history of breast or other cancer. In a group of twelve people having a history of breast cancer, the milk of all twelve contained a large number of particles. In a group of thirteen with a history of cancer of any sort on one side of the family, eleven had many particles, one a few and one none. In a group of seventy-one with no apparent history of cancer, twenty-nine had many particles, thirty-two a few and ten none (50). Leukemia in mice can also be transmitted by a cell-free extract which may contain a virus or free nucleic acid (51, 52) and the discovery of a virus in human lymphomas has been claimed (53).

The ways in which virus multiplication in the cell may be inhibited are limited by the fact that the virus largely makes use of the cells' own synthetic machinery. Most virus preparations show phosphatase, catalase and lipase activity, but these may simply be adsorbed from the host. However, riboflavin and biotin seem constantly to be present in vaccinia virus and a mucinase in influenza virus (54). T2 bacteriophage can supply some enzymes or the genetic material for their synthesis since nitrogen mustard treated Esch. coli where DNA synthesis has ceased and RNA is accumulating is restored to normal by infection with T2 (55).

An alternative method of attack is to supply substituted purine or pyrimidine derivatives in the hope that they will preferentially block the synthesis of virus DNA. 8-azo guanine has been shown to inhibit psittacosis (56) 2, 6-diamino purine inhibits Russian encephalitis (57) and various phenoxythiouracils inhibit vaccinia in mice (58). Other derivatives inhibit encephalomyelitis (59)and poliomyelitis (60). Many non-specific substances inhibit viruses, e.g. urea and other denaturing agents, proflavine, and amino acid analogues. The slight response of some virus diseases to antibiotics is probably due to selective enzyme inhibition (61).

Nucleic acids and bacteria.

Bacteria contain both DNA and RNA, the DNA being associated with rudimentary chromosomes (62). The RNA of the cell is thought to be responsible for the Gram-positive staining reaction (63).

The spontaneous change in old cultures of bacteria from the smooth, polysaccharide coated form (S) to the rough, uncoated form (R) occurs in many species. The change is accompanied by a decrease in antigenicity and virulence. The reverse, R→S change, has previously only been produced with difficulty by passage through animals. Recently, certain bacterial extracts called transforming

principles have been found to produce this reverse change. Great interest was aroused when it was found that the whole of this activity was contained in the DNA of the extract. Transforming principle from pneumococci type III was shown to change the R variants of type II to the S forms of type III when administered in very small amounts (64, 65). Hotchkiss (66) purified the DNA of this transforming principle till it contained less than 0.02% protein and showed that its activity was completely destroyed by desoxyribonuclease and not by proteolytic enzymes. The activity was also destroyed by substances like urea and mustard gas which alter the molecular configuration of the DNA. Boivin (67) showed similar R→S changes could be produced in Esch. Coli and Zamenhof (68) in H. influenza. Further emphasis on the genetic properties of DNA was shown by Ephrussi — Taylor's experiment where two different principles acting on the same bacterium produced a distinct third genetic change (69). A single example of transforming action due to RNA is known. RNA from many sources is capable of causing the appearance of streptolysin in cultures of strept. pyogenes (70).

DNA has also considerable influence on the resistance of bacteria to antibiotics. Hotchkiss (71) has shown that DNA extracted from penicillin resistant strains of pneumococci is capable of conferring resistance onto sensitive pneumococci. This activity is destroyed by desoxyribonuclease and transmitted in a gene-like manner. Similarly, streptomycin resistance has been induced in H. influenzae (72).

Conclusions

Sufficient examples have been given to show that the fundamental molecular approach to disease is capable of paying dividends. In fact, as far as the cancer problem is concerned, it is the only approach that has had any success at all in the chemotherapy of the disease. The vast literature of "trial and error" attempts at cancer chemo-therapy is witness to its futility. The startling manner in which nucleic acids are able to influence cell metabolism calls for further research into their structure. Their composition and their basic configuration are satisfactorily known but the details of the steric arrangement of the molecules seem to be the all important key to their specificity. Further X-ray diffraction and electron diffraction work to elucidate this will be difficult but not impossible.

REFERENCES

1. Davison, Conway and Butler, in Progress in Biophysics, **4,** 159 (1954).
2. Caspersson, "Cell growth and cell function," New York, Norton and Co. (1950).
3. Gulland and Jordon, J. Chem. Soc., 1129, 1131, (1947).
4. Chargaff, Vischer, Zamenhof, J. Biol. Chem., **173,** 327 (1948); **176,** 715 (1948); **177,** 429 (1949).
5. Hotchkiss, J. Biol. Chem., **175,** 315 (1948).
6. Chargaff, Exp. Cell Res., Supp. **2,** 41, (1952).
7. Pauling and Cory Proc. Nat. Acad. Sci., U.S., **39,** 84 (1953).
8. Wilkins, Stokes and Wilson. Nat., **171,** 738; **172,** 754 (1953).
9. Watson and Crick (a) Cold Spr. Harb. Symp. Quant. Biol., **18,** 123 (1953).
   (b) Nat. **171,** 737 (1953);
   (c) Discovery, **15,** 12 (1954).
10. Williams, Biochim. Biophys. Acta., **10,** 192 (1953).
11. Kahler and Lloyd, *ibid*, **10,** 355 (1953).
12. Schneider, J. Biol. Chem., **176,** 259 (1948).
13. Elson and Chargaff, Nat., **173,** 1037 (1954).
14. Marshak and Marshak, Nat., **174,** 919 (1954).
15. Sonneborn, Heredity, **4,** 11 (1950).
16. Boivin, Compt. rend. Acad. Sci., **226,** 1061 (1948).
17. Mirsky and Ris, J. Gen. Physiol., **34,** 451 (1951).
18. Haurowitz, Quart. Rev. Biol., **24,** 93 (1949).
19. Haurowitz and Crampton, Exp. Cell Res. Supp., **2,** 50 (1952).
20. Cuspersson, Die Naturwiss., **29,** 33 (1941).
21. Abrams, Archiv. Biochem., **30,** 90 (1951).
22. Gordon, Endeavor, **9,** 26 (1950).
23. Bordette, Cancer Res., **9,** 594 (1949).
24. Reveil, Ph.D. Thesis, Univ. of London, (1952).
25. Auerbach and Robson, Proc. Roy. Soc. Edin., **B62,** 271 (1947).
26. Whiting, Proc. Nat. Acad. Sci., **36,** 368 (1950).

REFERENCES (CONT.)

27. Mitchell and Houlahan, Federat. Proc., **6,** 506 (1947).
28. Haddow, "Physio-pathology of Cancer," Ed. Homburger & Fishman, Cassell, N.Y., p. 508 (1953).
29. Haddow, Kon and Ross, Nat., **162,** 824 (1948).
30. Butler and Smith, J. Chem. Soc., 3411 (1950). Nat., **165,** 847 (1950).
31. Needham, Biochem. J., **42,** XXV, (1948).
32. Haddow and Timms, Lancet, **1,** 207 (1953).
33. Haddow and Sexton, Nat., **157,** 500 (1946).
34. Smith and Butler, J. Amer. Chem. Soc., **73,** 258, (1951).
35. Limepros and Mosher, Amer. J. Roent., **63,** 681, 691 (1950).
36. Limperos, Cancer Res., **11,** 325 (1951).
37. Warren, *et alia*, Proc. Exp. Biol. Med., **72,** 662 (1949).
38. Luria, "General Virology", 101, 106, Wiley, N.Y. (1953).
39. Davidson, "Biochemistry of the Nucleic Acids", 187, Methuen, London (1953).
40. Dawson and McFarlane, Nat., **161,** 464 (1948).
41. Kahler, Bryan and Spec, J. Nat. Cancer Inst., **4,** 37 (1943)
42. Wyatt and Cohen, Nat., **170,** 1072 (1952).
43. Epstein, Adv. in Virus Res., **1,** 1 (1953). Also see (38).
44. Hershey and Chase, J. Gen. Physiol., **36,** 39 (1952).
45. Banfield *et alia*, Proc. Soc. Exp. Biol. Med., **77,** 843 (1951).
46. Hydén, Cold. Spr. H. Symp. Quant. Biol., **12,** 104 (1947).
47. Bittner, Science, **84,** 162 (1936).
48. Porter and Thompson, J. Exp. Med., **88,** 15 (1948).
49. Andervont, "A symposium on mammary tumours in mice". A.A.A.S. Washington, U.S.A. (1945).
50. Gross, McCarty and Gessler, Annals of N.Y. Acad. Sci., **54,** 1018 (1952).
51. Gross, Proc. Soc. Exp. Biol. Med., **76,** 27 (1951).
52. Gross *et alia*, Cancer Res., **12,** 267 (1952).
53. Hoster *et alia*, Cancer Res., **12,** 69 (1952).
54. Bauer, in "Nature of Virus multiplication," C.U.P. (1953).
55. Herriot, J. Gen. Physiol., **34,** 761 (1951).
56. Morgan, J. Expt. Med., **95,** 277 (1952).
57. Moore and Friend, Proc. Soc. Expt. Biol. Med., **78,** 153 (1951).
58. Thompson *et alia*, J. Immunol., **67,** 483 (1951). Science, **110,** 454 (1949).
59. Viser, Lagenburg and Pearson, Proc. Soc. Expt. Biol. Med., **79,** 571 (1952).
60. Brown, J. Immunol., **69,** 1441 (1952).
61. Gledhill and Andrews, Brit. J. Exp. Path., **32,** 559 (1951).
62. De Lamater, Hunter and Mudd, Exp. Cell. Res., suppl. **2,** 323 (1952).
63. Bartholomew and Mittwer, Bact. Res., **16,** 1 (1952).
64. Avery, Macleod and McCarty, J. Exp. Med., **79,** 137 (1944).
65. McCarty and Avery, J. Exp. Med., **83,** 89 (1946).
66. Hotchkiss, Exp. Cell. Res., Suppl., **2,** 383 (1952) and Phosp. Metab., **2,** 246 (1952).
67. Boivin, Cold Spr. Harb. Symp. Quant. Biol., **12,** 7 (1947).
68. Zamenhof *et alia*, Archiv. Biochem. Biophys., 40, 50 (1952).
69. Ephrussi — Taylor, Cold Spr. Harb. Symp. Quant. Biol., **16,** 445 (1951).
70. Bernheimes and Rollbart, J. Exp. Med., **88,** 149 (1948).
71. Hotchkiss, Exp. Cell. Res. Suppl., **2,** 384 (1952) and Cold Spr. Harb. Symp. Quant. Biol., **16,** 505 (1951).
72. Alexander and Leidy, J. Exp. Med., **97,** 17 (1953).

SO TO SPEAK . . .

In M.O.P.'s:

The patient does not drink, otherwise he leads a normal healthy life.

SPORT

RUGBY

Bart.'s v. Metropolitan Police (at Chislehurst). Lost 3-8 pts.

The Hospital, without Scott-Brown and Lammiman their chief scorers, came under heavy pressure as soon as the game started, playing up hill and against a strong wind.

About halfway through the first half the Police gained a deserved converted try, but after this could make little headway against a solid Hospital defence. Near half-time, however, they were able to increase their lead by a dropped goal.

In the second half the situation was completely reversed and it was Bart.'s turn to press. They were soon rewarded with an excellent penalty goal by Badley, but despite numerous attacks, made possible by the splendid hooking of Benedikz the Hospital back division could not show sufficient thrust to score from their many opportunities.

The poor form of the backs on this day resulted inevitably in the game deteriorating in the final stages into a forward battle in which the forwards showed they were more than equal to a much vaunted police eight.

Bart.'s v. Old Alleynians (at Chislehurst). Drawn 6-6 pts.

This was a very good game with both sides playing some good rugby to the delight of the spectators. Both sides were fairly evenly matched with the Hospital somewhat better outside the scrum.

The Old Alleynians opened the scoring with a good unconverted try, which roused the home side into a burst of activity which resulted in Phillips gaining a splendid unconverted try for the Hospital. Bart.'s then took the lead with a typical Badley penalty kick.

The Hospital were unfortunate not to increase their score from a copy-book movement by backs and forwards in which the ball was carried over the Old Alleynians line but could not be touched properly.

In the closing stages the Old Boys made a great effort to draw level and finally succeeded in gaining a try near the corner flag which was not converted.

St. Bart.'s v. Rugby (at Rugby). Lost 8-16 pts.

A very tired Bart.'s team took the field at Rugby — this being the fourth game in eight days. At first the Hospital continued to show the form which has produced such good results this season, and were soon leading by 8 pts. to 3 pts. (penalty goal) with a try made possible by a neat run by Phillips on the blind side and a well-timed pass to Tallack who dived over the line despite the attention of two defenders. Badley converted and later kicked a penalty goal. The Hospital should have gone further ahead when Scott-Brown made a break and looked certain to score when fouled a few yards from the line. A penalty kick was given when all thought a penalty try should have been awarded. Badley was unfortunate with the kick.

In the second half Lammiman injured his leg when about to tackle and Rugby were able to score a converted try. Lammiman then went off and the Hospital were unable to prevent Rugby building up a score of 16 points.

WOMEN'S HOCKEY CLUB

Since our last report we have played Chelsea Polytechnic—which we beat by 18 goals to nil; and Chislehurst Beavers where we won by 7-0. Last weekend the hockey team made a tour to Oxford, which unfortunately proved somewhat disappointing since most of the matches were cancelled owing to the condition of the pitches after the bad weather. However, we managed to

play a scratch Oxford University team, against whom we won 4-2—this match being played for the most part in semi-darkness. We also played an enjoyable match against University College men who afterwards entertained us with great hospitality. Next Saturday we are playing the 2nd round of the cup match—it is against King's College and takes place at Chislehurst, at 2.30 p.m.

United Hospitals team played their first match of the season on Wednesday, November 24th, and began their season well by beating Reading University 5-4. This team, which was previously rather scrappy has become very much better this year, and we would wish the players every success.

Change of Address

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Births

FOX. On November 11th, to Ann, wife of Dr. Ronald H. Fox, a daughter (Marion Judith).

GARROD. On November 27th, to Gwyneth, wife of Dr. D. C. H. Garrod, a second son.

HAYTER. On November 24th, to Joyce, wife of Dr. Russell Hayter, a daughter (Sally Joy), sister for Charles.

MULLAN. On November 15th, to Mary, wife of Dr. John Mullan, a brother for Susan, Michael and Monica.

WALLEY. On November 21st, to Veronica, wife of Jon Walley, F.R.C.S., a son (Robin John).

Degree

HADFIELD, Geoffrey John. M.S. of the University of London.

Deaths

BEATH. On November 24th, Dr. David Leslie Beath, O.B.E. Qualified 1897.

HOPTON. On November 17th, Dr. Jack Hopton, aged 52. Qualified 1929.

LLOYD. On November 28th, Dr. Eric Ivan Lloyd. Qualified 1916.

NIMMO. On November 15th, Surgeon Rear-Admiral Frank H. Nimmo, M.V.O. Qualified 1896.

SCOTT. On October 21st, in Johannesburg, Dr. James Duff Scott, aged 49. Qualified 1931.

Appointment

DONALD, Dr. K. W., has been given the title of first assistant in the Department of Medicine at the University of Birmingham from the date that Dr. W. Trend Cooke relinquishes his whole-time appointment.

R.A.M.C.

DODD. Captain (Brevet Major) T. A. J. M. Dodd has ceased to belong to the R.A.R.O. and has been granted the honorary rank of Major.

FARQUHAR. Captain (War Substantive Major) J. V. L. Farquhar—as above.

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BOOK REVIEWS

Proceedings of the First World Conference on Medical Education. Published by Oxford University Press. 804 pp. Price 60s.

The title of this volume gives little indication of the variety and excellence of its contents. The difficulty of recording the deliberations of a large Conference working in four separate sections must have posed many problems to the editor and he is to be congratulated both on the clarity of presentation and on the format of the book. The President of the Conference, Sir Lionel Whitby, explains in a foreword that the programme of the Conference was not an attempt at curriculum building, but rather directed towards selecting speakers who would stimulate thought and discussion on the methods of content of Medical Education. In this the planners have certainly succeeded. Naturally from the point of view of the readers' interest, the individual contributions vary in quality. Some idea of the field covered is given by the general plan of the Conference with its sections on the requirements of entry into Medical Schools, the aims and content of the medical curriculum, techniques and methods of medical education, and, finally, preventive and social medicine. The malcontent seeking evidence to support his grievance with the current state of affairs will be disappointed in the book as a field of research. For anyone who wishes to survey widely the theories and practices applied to medical education in many countries the volume will be of great value. Not least important are the summaries of the activities of the various sections made by their respective vice-presidents and rapporteurs which form a final section to the book. They give a fair and brief exposition of the work of each section and stimulate the reader to turn back to the original papers to cover the points in greater detail. I doubt if many students or practitioners would regard this book as essential for their own bookshelves, but it is certainly a most engaging work of reference which should be made easily available to all those who take seriously the problems of medical education

CHARLES F. HARRIS.

Scientific Books Libraries and Collectors. A Study of Bibliography and the Book Trade in Relation to Science. John L. Thornton and R. I. J. Tully. Published by the Library Association. 288 pp. Price 24s.

This book is essentially the work of the first author, and is the awaited companion (first envisaged in 1941) to his "Medical Books Libraries and Collectors," 1949.

It is an attractive, useful and fascinating book representing, as its publishers say, "a bibliographical approach to the history of science," and being surprisingly comprehensive in respect of the information which it contains from the first chapter, on "Scientific Literature Before the Invention of Printing," to the twelfth, on "Scientific Libraries of Today," which is followed by a Bibliography and a properly effective Index. Though obviously intended as a reference book, it is so full of interesting items and so pleasantly written that one goes on reading to see what else happened in that particular century, and the next one, and so on!

Those who seek Mr. Thornton's help within our own College Library are very aware of his erudition, friendliness, and eagerness to help one in every possible way. It almost seems as if this printed book has captured some of those same qualities, and that is really rather exciting news. For it means that, with this new work and its previously published medical counterpart, we can have Mr. Thornton with us in spirit in our own personal libraries and elsewhere, extending to us there that wonderful measure of assistance on which we in Bart's have learned that we may always count.

Fancy being offered all that for a penny a page!

K. J. FRANKLIN.

Techniques in Clinical Chemistry. Frederick N. Bullock. Published by John Wright & Sons. 182 pp. Price 16s. 6d.

This book is named "a handbook for Medical Laboratory Technicians." Its origin is said to lie in notes made while the author was engaged in teaching student technicians in the West Indies. This history explains its good features and its weaknesses. It is virtually a collection of useful notes, and one cannot believe that anyone will fail to understand the titration of oxalate with permanganate after having been led over this intellectual obstacle race on a leading rein by Mr. Bullock. On the other hand, one doubts whether the description of the measurement of alkali reserve will help the uninitiated or contribute to the knowledge or technique of the already taught. In this type of book where only generally accepted orthodox methods should be described, one can see no reason why the only technique of differential plasma protein estimation should be one in which the tyrosine groups of protein are measured by their reaction with Ciocalteu's reagent. The flame photometer has taken the place of chemical determinations in the measurement of potassium and sodium, and one would expect this development to be mentioned. Lastly the unqualified recommendation of detergents for cleaning laboratory glassware does not take account of the difficulties these compounds introduce when enzymes are measured.

H. LEHMANN.

Varicose Veins. R. Rowden Foote. Published by Duckworth. 110 pp. Price 8s. 6d.

This book is one of a series under the general editorship of Lord Horder, which has for its purpose the explanation of various ailments to the patient.

Writing for the general public about medical matters is always a difficult task and the author must present his subject in a straightforward intelligible manner and yet avoid over simplification. He also has a duty to avoid partisan presentation of controversial material to his uninformed lay audience. Dr. Foote is not entirely blameless in this latter respect in that on two occasions he inserts propaganda for regarding varicose veins as a specialised entity to be divorced from general surgery and to be elevated to, "a speciality of no less importance than that of bones, eyes, teeth and other organs of the body."

While this opinion is perfectly understandable from his point of view it is misplaced in a book of this kind. Again, the general practitioner comes in for some heavy criticism on more than one occasion and while this may be justifiable it is surely wrong in this context. However, the author has succeeded in describing the anatomy, physiology, pathology and treatment of varicose veins in a straightforward manner although the distinction between the sequelae and prognosis of primary varicose veins and deep vein disease is not sufficiently emphasised. I submitted this book to two patients with varicose disease and they liked it. They were both of average intelligence and were interested in their complaint. Unfortunately the type of patient who is most in need of instruction and understanding of his "bad leg", often has a mind as indolent as his ulcers and would perhaps be better reached by a pamphlet written in the form of short definite instructions.

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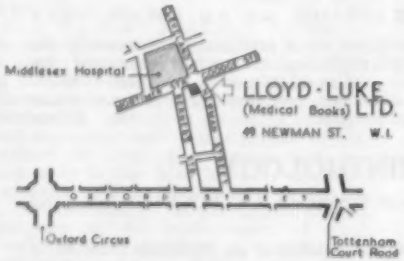

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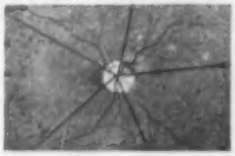

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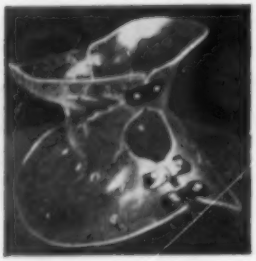

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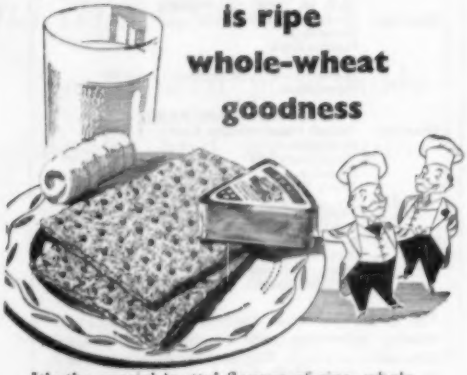

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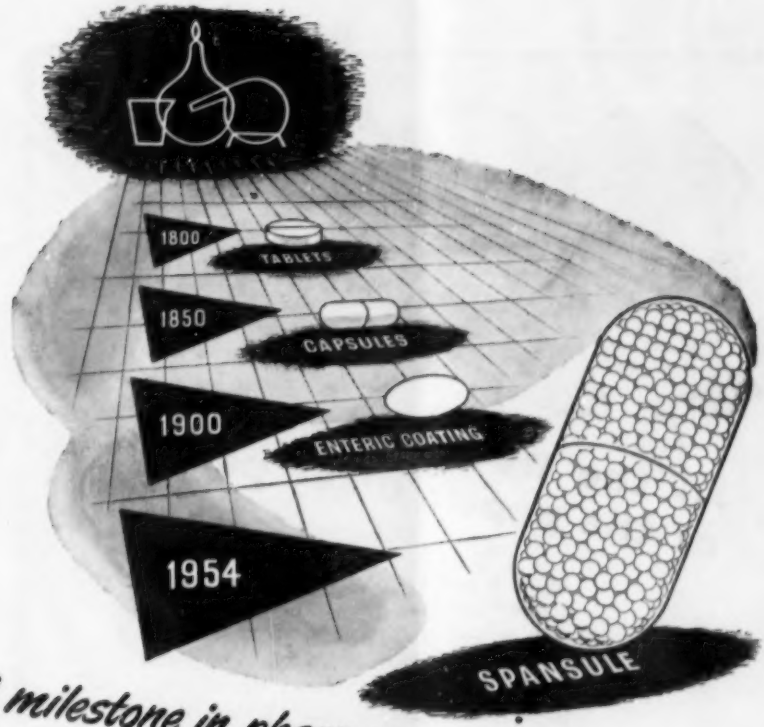

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